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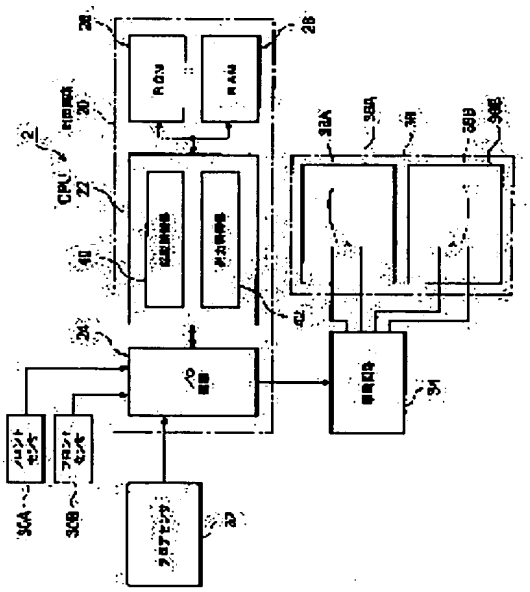
(54) START CONTROL DEVICE FOR OCCUPANT PROTECTION DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To accurately judge the configuration of collision by accurately detecting impulse during collision, thereby setting the output of an inflator for an occupant protection device to be an optimum value depending on the configuration of collision.
SOLUTION: A start control device is provided for controlling the start of an air bag device 36 mounted on a vehicle when the vehicle collides with an object. It includes front sensors 30A, 30B provided near the colliding portion of the vehicle, a floor sensor 32 provided behind the vehicle beyond the front sensors and an output value controller 42 for controlling output values for the inflators 36A, 36B during starting the air bag device in accordance with detection values for the front sensors and the floor sensor.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The 1st impact detection means which is the starting control unit of the occupant crash protection which controls starting of the occupant crash protection carried in this car when a car collides with a collision object, and was established near the collision part of said car, The 2nd impact detection means formed in car back rather than said 1st impact detection means, The starting control unit of the occupant crash protection characterized by having the output-value control means which controls the output value of the inflator at the time of starting said occupant crash protection based on the detection value of said 1st impact detection means and said 2nd impact detection means.
[Claim 2] Said output-value control means in the range where the integral value of the detection value of said 2nd impact detection means is smaller than the 2nd predetermined value when the integral value of the detection value of said 1st impact detection means is larger than the 1st predetermined value In the range where the integral value of the detection value of said 2nd impact detection means is smaller than the 2nd predetermined value, when the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value, it compares. The starting control unit of the occupant crash protection according to claim 1 characterized by enlarging the output value of said inflator.
[Claim 3] It has a detection means further at the time of the collision which detects the time of the collision of said car. Said output-value control means The time amount from the time of the collision detected by the detection means at the time of said collision in the range shorter than the 3rd predetermined value when the integral value of the detection value of said 1st impact detection means is larger than the 1st predetermined value In the range shorter than the 3rd predetermined value, the time amount from the time of the collision detected by the detection means at the time of said collision compares, when the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value. The starting control unit of the occupant crash protection according to claim 1 characterized by enlarging the output value of said inflator.
[Claim 4] Said 1st detection means is the starting control unit of occupant crash protection given in any 1 term of claim 1 characterized by to be constituted by the right anterior-part detection means formed in the left anterior part detection means formed in the left anterior part of said car, and right anterior part, and to control the output value of said inflator by said output-value control means based on the detection value of said left anterior-part detection means and said right anterior-part detection means - claim 3.
[Claim 5] Said output-value control means With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, or said right anterior part detection means When either of the values calculated based on the detected detection value and the detection value of said 2nd impact detection means exceeds a predetermined threshold smaller than said 1st predetermined value and another side does not exceed a predetermined threshold With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, and said right anterior part detection means The starting control unit of the occupant crash protection according to claim 4 characterized by enlarging the output value of said inflator as compared with the case where both values calculated based on the detected detection value and the detection value of said 2nd impact detection means exceed a predetermined threshold smaller than said 1st predetermined value.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the starting control unit of the occupant crash protection which controls starting of the occupant crash protection which takes care of crew at the time of a car collision.
[0002]
[Description of the Prior Art] In order to take care of crew conventionally at the time of a car collision, air bag equipment is carried in the car. In this air bag equipment, the equipment which controls the output of an inflator based on the magnitude of a collision rate exists (refer to JP,10-29494,A). In this air bag equipment, a collision rate is found based on the integral value and differential value of acceleration which were detected by the acceleration sensor, and the output of an inflator is controlled based on this collision rate.
[0003]
[Problem(s) to be Solved by the Invention] However, in above-mentioned air bag equipment, there is a limitation in bringing an acceleration sensor close to a collision part, and installing, and if an acceleration sensor is kept away from a collision part and installed, since the impact in the case of a collision will become that it is hard to be transmitted to an acceleration sensor, delay will arise in detection of acceleration or a collision rate.
[0004] The technical problem of this invention is judging a collision gestalt exactly and making the output of the inflator of occupant crash protection into an optimum value according to a collision gestalt by detecting the impact at the time of a collision exactly.
[0005]
[Means for Solving the Problem] The starting control unit of occupant crash protection according to claim 1 The 1st impact detection means which is the starting control unit of the occupant crash protection which controls starting of the occupant crash protection carried in this car when a car collides with a collision object, and was established near the collision part of said car, It has the output-value control means which controls the output value of the inflator at the time of starting said occupant crash protection based on the detection value of the 2nd impact detection means formed in car back, said 1st impact detection means, and said 2nd impact detection means rather than said 1st impact detection means.
[0006] here -- the output value of an inflator -- the blow of gas of an inflator -- powerful -- it is -- saying the amount of blows of gas of the inflator per time amount, and controlling the output value of an inflator -- a blow of gas -- powerful -- it is -- adjusting the amount of blowouts to the suitable value within the limits which can be adjusted in the case of the inflator which can be adjusted on a stepless story -- saying -- moreover, a blow of gas -- powerful -- it is -- in the case of the inflator which can adjust the amount of blowouts to two steps, it says adjusting to high power or low-power output.
[0007] According to the starting control unit of this occupant crash protection according to claim 1, since the output value of the inflator at the time of starting occupant crash protection by the output-value control means based on the detection value of the 1st impact detection means and the 2nd impact detection means, i.e., the detection value of the detection means arranged in a mutually different location, is controlled, occupant crash protection can be started with the optimal output according to the violence of a collision.
[0008] Moreover, the starting control unit of occupant crash protection according to claim 2 Said output-value control means of the starting control unit of occupant crash protection according to claim 1 The integral value of the detection value of said 2nd impact detection means The 2nd predetermined value The integral value of the detection value of said 1st impact detection means in the range smaller than the right end of the threshold 60 of drawing 4 , the threshold 66 of drawing 8 , and the threshold 74 of drawing 11 For

example, the 1st predetermined value, For example, when larger than the soffit of the threshold 60 of drawing 4 , the threshold 66 of drawing 8 , and the threshold 74 of drawing 11 It is characterized by enlarging the output value of said inflator as compared with the case where the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value, in the range where the integral value of the detection value of said 2nd impact detection means is smaller than the 2nd predetermined value.

[0009] Moreover, the starting control unit of occupant crash protection according to claim 3 The starting control unit of occupant crash protection according to claim 1 is further equipped with a detection means at the time of the collision which detects the time of the collision of said car. Said output-value control means The time amount from the time of the collision detected by the detection means at the time of said collision The 3rd predetermined value, In the range shorter than the right end of the threshold 64 of drawing 7 , for example, when the integral value of the detection value of said 1st impact detection means is larger than the 1st predetermined value Time amount from the time of the collision detected by the detection means at the time of said collision is characterized by enlarging the output value of said inflator in the range shorter than the 3rd predetermined value as compared with the case where the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value.

[0010] According to this claim 2 and the starting control unit of occupant crash protection according to claim 3, in a high-speed collision An impact big when the integral value of the detection value of an impact detection means of the early stages of a collision, i.e., the 2nd, is smaller than a predetermined value, or when the time amount from the time of the collision detected by the detection means at the time of a collision is shorter than a predetermined value occurs. That is, since the integral value of the detection value of the 1st impact detection means becomes larger than a predetermined value, it can be judged as a high-speed collision, and based on this decision result, the output of an inflator can be made suitable.

[0011] Moreover, the starting control unit of occupant crash protection according to claim 4 Said 1st detection means of the starting control unit of occupant crash protection given in any 1 term of claim 1 - claim 3 It is constituted by the right anterior part detection means formed in the left anterior part detection means formed in the left anterior part of said car, and right anterior part, and is characterized by controlling the output value of said inflator by said output-value control means based on the detection value of said left anterior part detection means and said right anterior part detection means.

[0012] Moreover, the starting control unit of occupant crash protection according to claim 5 In the starting control unit of occupant crash protection according to claim 4 said output-value control means With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, or said right anterior part detection means A predetermined threshold with either smaller than said 1st predetermined value of the values calculated based on the detected detection value and the detection value of said 2nd impact detection means, For example, when the soffit of the threshold 68 of drawing 8 and the threshold 76 of drawing 11 is exceeded and another side does not exceed a predetermined threshold With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, and said right anterior part detection means As compared with the case where both values calculated based on the detected detection value and the detection value of said 2nd impact detection means exceed a predetermined threshold smaller than said 1st predetermined value, it is characterized by enlarging the output value of said inflator.

[0013] According to this claim 4 and the starting control unit of occupant crash protection according to claim 5, the high-speed irregular collision of low-speed right **, high-speed offset collision, etc. can be distinguished exactly, and the output of an inflator can be controlled based on this distinction result.

[0014]

[Embodiment of the Invention] Hereafter, with reference to drawing 1 - drawing 5 , the starting control unit of the occupant crash protection concerning the gestalt of implementation of the 1st of this invention is explained.

[0015] As shown in drawing 1 , the starting control device 2 of air bag equipment is equipment which controls starting of air bag equipment 36, and is mainly equipped with a control circuit 20, the front sensors (1st impact detection means) 30A and 30B, the floor sensor (2nd impact detection means) 32, and the actuation circuit 34.

[0016] Among these, the front sensors 30A and 30B are sensors of the electronic formula for detecting the anterior part of a car, i.e., the magnitude of the impact which is generally established near the collision part of a car and joins a car, specifically detect the deceleration which joins a car and output signal G' (t)

corresponding to deceleration. Moreover, the floor sensor 32 is the so-called acceleration sensor for measuring the impact which joins a car and is transmitted through a car body, specifically detects the deceleration which joins a cross direction to a car at any time, and outputs signal G (t) corresponding to the detection value (deceleration).

[0017] The control circuit 20 is equipped with a central processing unit (CPU) 22, the I/O circuit (I/O circuit) 24, read only memory (ROM) 26, and random-access-memory 28 grade, and each component is connected by bus. Among these, CPU22 performs starting control of air bag equipment 36 according to the program memorized by ROM26. Moreover, RAM28 is the memory for storing the data obtained by the signal from the front sensors 30A and 30B and the floor sensor 32, the result which CPU22 calculated based on it. Furthermore, the I/O circuit 24 is a circuit for performing the output of the seizing signal over the input of the signal from the front sensors 30A and 30B and the floor sensor 32, and the actuation circuit 34 etc.

[0018] Moreover, CPU22 compares with a predetermined threshold the value acquired based on the detection value of the floor sensor 32, and functions as the starting control section 40 which controls starting of air bag equipment 36 based on the comparison result, and the output-control section 42 which controls the actuation output of air bag equipment 36 based on the detection value of the front sensors 30A and 30B, and the detection value of the floor sensor 32.

[0019] Moreover, the actuation circuit 34 is a circuit which energize to Squibb 38A and 38B of the inflators 36A and 36B in air bag equipment 36, and it is made to light with the seizing signal from a control circuit 20. Furthermore, air bag equipment 36 is equipped with the generation-of-gas agent (not shown) lit by Squibb 38A and 38B besides Squibb 38A and 38B which is ignitions, the bag (not shown) which expands by the gas which occurred.

[0020] Among these components, a control circuit 20, the floor sensor 32, and the actuation circuit 34 are contained by ECU (electronic control)44 shown in drawing 2 , and are attached on the floor tunnel 48 in a car 46 which exists in the center mostly. Moreover, front sensor 30A is arranged in the anterior part of the car 46 ahead of right slant to the floor sensor 32 in ECU44, and front sensor 30B is arranged in the anterior part of the car 46 of the method of the diagonal left to the floor sensor 32.

[0021] Next, the starting control of air bag equipment performed in CPU22 is explained. As shown in drawing 3 , the starting control section 40 in CPU22 is equipped with operation part 50 and the starting judging section 52. The floor sensor 32 measures the deceleration which joins a cross direction to a car 46 at any time, and outputs signal G (t) which shows the deceleration. The operation part 50 of the starting control section 40 performs an operation with the predetermined operation 1, i.e., a formula, and a formula 2 to decelerating G (t) outputted from the floor sensor 32, and calculates the operation values V10 and Vn. V10 is the section integral value of decelerating G (t) which divided the period from collision generating to collision termination at the section in every 10ms here, and Vn is the integral value of decelerating [of the time amount (n is the time amount for about 100ms) required by collision termination from collision generating] G (t). That is, Vn is rate change (slowdown rate) from collision generating.

[0022]

[Equation 1]

$$V_{10} = \int_{t-10ms}^{t} G(t)dt$$

G(t):フロアセンサ出力

[Equation 2]

$$V_n = \int G(t)dt$$

G(t):フロアセンサ出力

[0023] Moreover, the output-control section 42 is equipped with operation part 54 and the output decision section 56. The front sensors 30A and 30B output signal G' (t) corresponding to a detection value (deceleration), respectively. The operation part 54 of the output-control section 42 performs a predetermined operation, i.e., an operation with a formula 3, to each of decelerating G' (t) outputted from the front sensors 30A and 30B, and calculates the operation value V5. V5 is the section integral value of decelerating G' (t) which divided the period from collision generating to collision termination at the section in every 5ms here.

[0024]

[Equation 3]

$$V_5 = \int_{t-5ms}^{t} G'(t)dt$$

G '(t):フロントセンサ出力

[0025] The larger one is inputted into the output decision section 56 in the operation value V5 based on decelerating G' (t) outputted from front sensor 30A here, and the operation value V5 based on decelerating G' (t) outputted from front sensor 30B. Moreover, the operation value Vn calculated by the operation part 50 of the starting control section 40 is inputted into the output decision section 56.
[0026] The output decision map which has the output decision threshold 60 as shown in drawing 4 is memorized by the output decision section 56. This output decision map takes the operation value V5 on an axis of ordinate while taking the operation value Vn on an axis of abscissa. The output decision section 56 compares the value defined with the output decision threshold 60 and the operation values V5 and Vn of an output decision map, and when the value defined with the operation values V5 and Vn exceeds the output decision threshold 60, the signal which shows that the output of an inflator is made into high power is outputted to the starting judging section 52. In addition, when the value defined with the operation values V5 and Vn does not exceed the output decision threshold 60, the signal which shows that the output of an inflator is made into low-power output is outputted to the starting judging section 52.
[0027] That is, in a high-speed collision, as the value defined with the operation values V5 and Vn shows drawing 4 as a continuous line, it changes. If it puts in another way, since the front sensors 30A and 30B detect big deceleration while a car 46 seldom slows down (very big deformation arises in the front section), in a high-speed collision, the signal which shows that the output of an inflator is made into high power will be outputted.
[0028] On the other hand, in a low-speed collision, as the value defined with the operation values V5 and Vn shows drawing 4 with a broken line, it changes. If it puts in another way, since the front sensors 30A and 30B do not detect not much big deceleration even if a car 46 slows down to some extent (deformation of the front section is small), in a low-speed collision, the signal which shows that the output of an inflator is made into low-power output will be outputted.
[0029] In the starting judging section 52, the value defined with the operation values V10 and Vn is compared with the threshold 62 of the judgment map memorized by the starting judging section 52. That is, the judgment map which has the threshold 62 as shown in drawing 5 is memorized by the starting judging section 52. This judgment map takes the operation value V10 on an axis of ordinate while taking the operation value Vn on an axis of abscissa.
[0030] Therefore, the starting judging section 52 compares the value defined with a threshold 62 and the operation values V10 and Vn calculated by operation part 50, and when the value defined with the operation values V10 and Vn exceeds a threshold 62, the starting judging section 52 outputs a seizing signal A to the actuation circuit 34 (refer to drawing 1). In addition, the signal which shows the output of the inflator determined by the output decision section 56 is included in a seizing signal A.
[0031] When the signal of the purport which makes an inflator high power is included in the seizing signal A, the actuation circuit 34 is energized to Squibb 38A and 38B, and is made to light a generation-of-gas agent (not shown) in Squibb 38A and 38B. On the other hand, when the signal of the purport which makes an inflator low-power output is included in the seizing signal A, it energizes to Squibb 38A and a generation-of-gas agent is made to light only by Squibb 38A.
[0032] the violence of the collision from judging the violence of a collision based on the detection value detected by the detection value and the floor sensor 32 which were detected by the front sensors 30A and 30B according to the starting control unit of the occupant crash protection concerning the gestalt of this 1st operation -- an early stage -- and judging exactly can come and air bag equipment 36 can be started with the optimal output according to the violence of a collision.
[0033] Next, with reference to drawing 6 and drawing 7 , the starting control unit of the air bag equipment concerning the gestalt of implementation of the 2nd of this invention is explained. In addition, the starting control device of the air bag equipment concerning the gestalt of this 2nd operation is explained using the sign given to each configuration of the starting control device 20 of the air bag equipment concerning the gestalt of the 1st operation from it being what has the almost same configuration as the starting control device of the air bag equipment concerning the gestalt of the 1st operation (refer to drawing 1).
[0034] As shown in drawing 6 , the output-control section 42 concerning the gestalt of this 2nd operation is equipped with operation part 54 and the output decision section 56. The front sensors 30A and 30B output signal G' (t) corresponding to a detection value (deceleration), respectively. The operation part 54 of the output-control section 42 judges that the collision occurred on the car 46, when detection value

(deceleration) G[of front sensor 30A or 30B]' (t) exceeds a predetermined value, namely, it detects the time of a collision, and measures the time amount from the time of a collision. The time amount t from the time of this measured collision is inputted into the output decision section 56. Moreover, the larger one is inputted into the output decision section 56 in the operation value V5 based on decelerating G' (t) outputted from front sensor 30A called for in operation part 54, and the operation value V5 based on decelerating G' (t) outputted from front sensor 30B.

[0035] The output decision map which has the output decision threshold 64 as shown in drawing 7 is memorized by the output decision section 56. This output decision map takes the operation value V5 on an axis of ordinate while taking the time amount t from the time of a collision on an axis of abscissa. The output decision section 56 compares the value defined by the output decision threshold 64 of an output decision map, the operation value V5, and the time amount t from the time of a collision, and when the value defined by the operation value V5 and the time amount t from the time of a collision exceeds the output decision threshold 64, the signal carrying out the output of an inflator as high power is shown outputs to the starting judging section 52. In addition, when the value defined by the operation value V5 and the time amount t from the time of a collision does not exceed the output decision threshold 64, the signal which shows that the output of an inflator is made into low-power output is outputted to the starting judging section 52.

[0036] That is, in a high-speed collision, the signal which shows that the output of an inflator is made into high power is outputted. Moreover, in a low-speed collision, the signal which shows that the output of an inflator is made into low-power output is outputted.

[0037] In the starting judging section 52, the value defined with the operation values V10 and Vn is compared with the threshold 62 of the judgment map memorized by the starting judging section 52 (refer to drawing 5). Therefore, the starting judging section 52 compares the value defined with a threshold 62 and the operation values V10 and Vn calculated by operation part 50, and when the value defined with the operation values V10 and Vn exceeds a threshold 62, the starting judging section 52 outputs a seizing signal A to the actuation circuit 34 (refer to drawing 1). In addition, the signal which shows the output of the inflator determined by the output decision section 56 is included in a seizing signal A.

[0038] When the signal of the purport which makes an inflator high power is included in the seizing signal A, the actuation circuit 34 is energized to Squibb 38A and 38B, and is made to light a generation-of-gas agent (not shown) in Squibb 38A and 38B. On the other hand, when the signal of the purport which makes an inflator low-power output is included in the seizing signal A, it energizes to Squibb 38A and a generation-of-gas agent is made to light only by Squibb 38A.

[0039] According to the starting control unit of the occupant crash protection concerning the gestalt of this 2nd operation, it can come to judge the violence of a collision exactly from judging the violence of a collision based on the detection value detected by the front sensors 30A and 30B and the time amount t from the time of a collision, and air bag equipment 36 can be started with the optimal output according to the violence of a collision.

[0040] Next, with reference to drawing 8 , the starting control unit of the air bag equipment concerning the gestalt of implementation of the 3rd of this invention is explained. In addition, the starting control device of the air bag equipment concerning the gestalt of this 3rd operation is explained using the sign given to each configuration of the starting control device 20 of the air bag equipment concerning the gestalt of the 1st operation from it being what has the almost same configuration as the starting control device of the air bag equipment concerning the gestalt of the 1st operation (refer to drawing 1 and drawing 3).

[0041] The output-control section 42 concerning the gestalt of this 3rd operation is equipped with operation part 54 and the output decision section 56. The front sensors 30A and 30B output signal G' (t) corresponding to a detection value (deceleration), respectively. The operation part 54 of the output-control section 42 performs a predetermined operation, i.e., an operation with a formula 3, to each of decelerating G' (t) outputted from the front sensors 30A and 30B, and calculates the operation value V5.

[0042] The operation value V5 based on decelerating G' (t) outputted from the operation value V5 based on decelerating G' (t) outputted from front sensor 30A here and front sensor 30B is inputted into the output decision section 56. Moreover, the operation value Vn calculated by the operation part 50 of the starting control section 40 is inputted into the output decision section 56.

[0043] The output decision map which has the output decision thresholds 66 and 68 as shown in drawing 8 (a) and (b) is memorized by the output decision section 56. This output decision map takes the operation value V5 on an axis of ordinate while taking the operation value Vn on an axis of abscissa. The output decision section 56 compares the value defined with the output decision thresholds 66 and 68 of an output

decision map, and the operation values V5 and Vn based on the deceleration detected by front sensor 30A. The value defined with these operation values V5 and Vn exceeds the output decision threshold 66, and the value defined with the output decision thresholds 66 and 68 and the operation values V5 and Vn based on the deceleration detected by front sensor 30B is compared. When the value defined with these operation values V5 and Vn exceeds the output decision threshold 66, it judges that high-speed right ** occurred, and the signal which shows that the output of an inflator is made into high power is outputted to the starting judging section 52. namely, any of the value defined with the operation values V5 and Vn when high-speed right ** occurs -- although -- since the output decision threshold 66 is exceeded as a thick line shows drawing 8 (a) and (b), it can be judged that high-speed right ** occurred.

[0044] Moreover, the output decision section 56 compares the value defined with the output decision thresholds 66 and 68 of an output decision map, and the operation values V5 and Vn based on the deceleration detected by front sensor 30A. The value defined with these operation values V5 and Vn does not exceed a threshold 66 more than the output decision threshold 68. And the value defined with the output decision thresholds 66 and 68 and the operation values V5 and Vn based on the deceleration detected by front sensor 30B is compared. When the value defined with these operation values V5 and Vn does not exceed a threshold 66 more than the output decision threshold 68, it judges that low-speed right ** occurred, and the signal which shows that the output of an inflator is made into low-power output is outputted to the starting judging section 52. namely, any of the value defined with the operation values V5 and Vn when low-speed right ** occurs -- although -- since a threshold 66 is not exceeded more than the output decision threshold 68 as a thin continuous line shows drawing 8 (a) and (b), it can be judged that low-speed right ** occurred.

[0045] Furthermore, the value as which the output decision section 56 is determined with the output decision thresholds 66 and 68 of an output judging map, and the operation values V5 and Vn based on the deceleration by which it was detected by front sensor 30A, The value defined with the operation values V5 and Vn based on the deceleration detected by front sensor 30B is compared. It is judged that the high-speed ODB collision (irregular collision when a collision object is soft) occurred when [of these values] the output decision threshold 68 was exceeded on the other hand (collision side of a car) and another side (un-colliding side of a car) did not exceed a threshold 68. The signal which shows that the output of an inflator is made into high power is outputted to the starting judging section 52. That is, when a high-speed ODB collision occurs, since the output decision threshold 68 is exceeded as one side of the value defined with the operation values V5 and Vn shows drawing 8 (a) and (b) with a broken line, and the output decision threshold 68 is not exceeded as another side shows drawing 8 (a) and (b) with a broken line, it can be judged that the high-speed ODB collision occurred.

[0046] In the starting judging section 52, the value defined with the operation values V10 and Vn is compared with the threshold 62 of the judgment map memorized by the starting judging section 52 (refer to drawing 5). Therefore, the starting judging section 52 compares the value defined with a threshold 62 and the operation values V10 and Vn calculated by operation part 50, and when the value defined with the operation values V10 and Vn exceeds a threshold 62, the starting judging section 52 outputs a seizing signal A to the actuation circuit 34 (refer to drawing 1). In addition, the signal which shows the output of the inflator determined by the output decision section 56 is included in a seizing signal A.

[0047] When the signal of the purport which makes an inflator high power is included in the seizing signal A, the actuation circuit 34 is energized to Squibb 38A and 38B, and is made to light a generation-of-gas agent (not shown) in Squibb 38A and 38B. On the other hand, when the signal of the purport which makes an inflator low-power output is included in the seizing signal A, it energizes to Squibb 38A and a generation-of-gas agent is made to light only by Squibb 38A.

[0048] According to the starting control unit of the occupant crash protection concerning the gestalt of this 3rd operation, it can come to judge the gestalt of a collision exactly from judging the gestalt of a collision based on the detection value detected by the detection value and the floor sensor 32 which were detected by the front sensors 30A and 30B, and air bag equipment 36 can be started with the optimal output according to the gestalt of a collision.

[0049] Next, with reference to drawing 9 - drawing 11 , the starting control unit of the air bag equipment concerning the gestalt of implementation of the 4th of this invention is explained. In addition, although the control device of the air bag equipment concerning the gestalt of this 4th operation has the almost same configuration as the control device (refer to drawing 1) of the air bag equipment concerning the gestalt of the 1st operation, they differ in that it does not have the output-control section 42 as shown in drawing 9 .

[0050] The starting control section 40 of the starting control unit of this air bag equipment is equipped with

operation part 70 and the output decision starting judging section 72 as shown in drawing 10 . The front sensors 30A and 30B output signal G' (t) corresponding to a detection value (deceleration), respectively. Operation part 70 performs a predetermined operation, i.e., an operation with a formula 3, to each of decelerating G' (t) outputted from the front sensors 30A and 30B, and calculates the operation value V5. The larger one is inputted into the output decision starting judging section 72 in the operation value V5 based on decelerating G' (t) outputted from front sensor 30A here, and the operation value V5 based on decelerating G' (t) outputted from front sensor 30B.

[0051] Moreover, operation part 70 performs a predetermined operation, i.e., the operation according to a formula 2 several [more than], to decelerating G (t) outputted from the floor sensor 32, and calculates the operation value Vn. This operation value Vn is inputted into the output decision starting judging section 72.

[0052] The map which has the output decision starting judging thresholds 74 and 76 as shown in drawing 11 is memorized by the output decision starting judging section 70. This map takes the operation value V5 on an axis of ordinate while taking the operation value Vn on an axis of abscissa. The value defined with the operation values V5 and Vn based on the deceleration detected by the output decision starting judging thresholds 74 and 76, front sensor 30A, or 30B of a map compares, and the output decision starting judging section 70 outputs the seizing signal for starting an inflator at high power to the actuation circuit 34, when the value defined with these operation values V5 and Vn exceeds the output decision starting judging threshold 74.

[0053] Moreover, when the value defined with the operation values V5 and Vn does not exceed the output decision starting judging threshold 74 but exceeds the output decision starting judging threshold 76, the seizing signal for starting an inflator by low-power output to the actuation circuit 34 is outputted. On the other hand, when the value defined with the operation values V5 and Vn does not exceed the output decision starting judging threshold 74, a seizing signal is not outputted to the actuation circuit 34.

[0054] According to the starting control unit of the occupant crash protection concerning the gestalt of this 4th operation, only one map memorized by the output decision starting judging section 70 can perform not only the decision of the output of an inflator but the starting judging of air bag equipment.

[0055] In addition, according to the gestalt of above-mentioned operation, although the operation value V5 is taken on the axis of ordinate of an output decision map, this operation value is selectable in the optimal value according to the operation value V10 and V15 grade type of a car.

[0056] In the gestalt of the above-mentioned 1st and the 2nd operation moreover, in the output decision section 56 Although the larger one is inputted in the operation value V5 based on decelerating G' (t) outputted to the output decision starting judging section 72 from front sensor 30A in the gestalt of the 4th operation, and the operation value V5 based on decelerating G' (t) outputted from front sensor 30B You may make it input into the output decision section 56 or the output decision starting judging section 72 the average of the operation value V5 based on decelerating G' (t) outputted from front sensor 30A, and the operation value V5 based on decelerating G' (t) outputted from front sensor 30B.

[0057] Moreover, according to the gestalt of above-mentioned operation, although the integral value based on the operation value Vn, i.e., the detection value of a floor sensor, is used for the axis of ordinate of an output decision map at the axis of abscissa using the integral value based on the operation value V5, i.e., the detection value of a front sensor, it is not limited to an integral value and this operation value can use various kinds of operation values.

[0058] Moreover, although it has two inflators 36A and 36B in air bag equipment 36 and enables it to adjust the blowout force or the amount of blowouts of gas to two steps (high power or low-power output) in the gestalt of above-mentioned operation Air bag equipment 36 is equipped with the inflator which can adjust the blowout force or the amount of blowouts of gas on a stepless story, and you may make it adjust the blowout force or the amount of blowouts of gas to a suitable value.

[0059]

[Effect of the Invention] According to invention according to claim 1, since the output value of the inflator at the time of starting occupant crash protection by the output-value control means based on the detection value of the detection means arranged in a mutually different location is controlled, occupant crash protection can be started with the optimal output according to the violence of a collision.

[0060] Moreover, according to claim 2 publication and invention according to claim 3, from a big impact occurring in early stages of a collision in a high-speed collision, it can be judged as a high-speed collision by this, and the output of an inflator can be made suitable based on this decision result.

[0061] Moreover, according to claim 4 publication and invention according to claim 5, low-speed right ** and a high-speed irregular collision can be distinguished exactly, and the output of an inflator can be

controlled based on this distinction result.

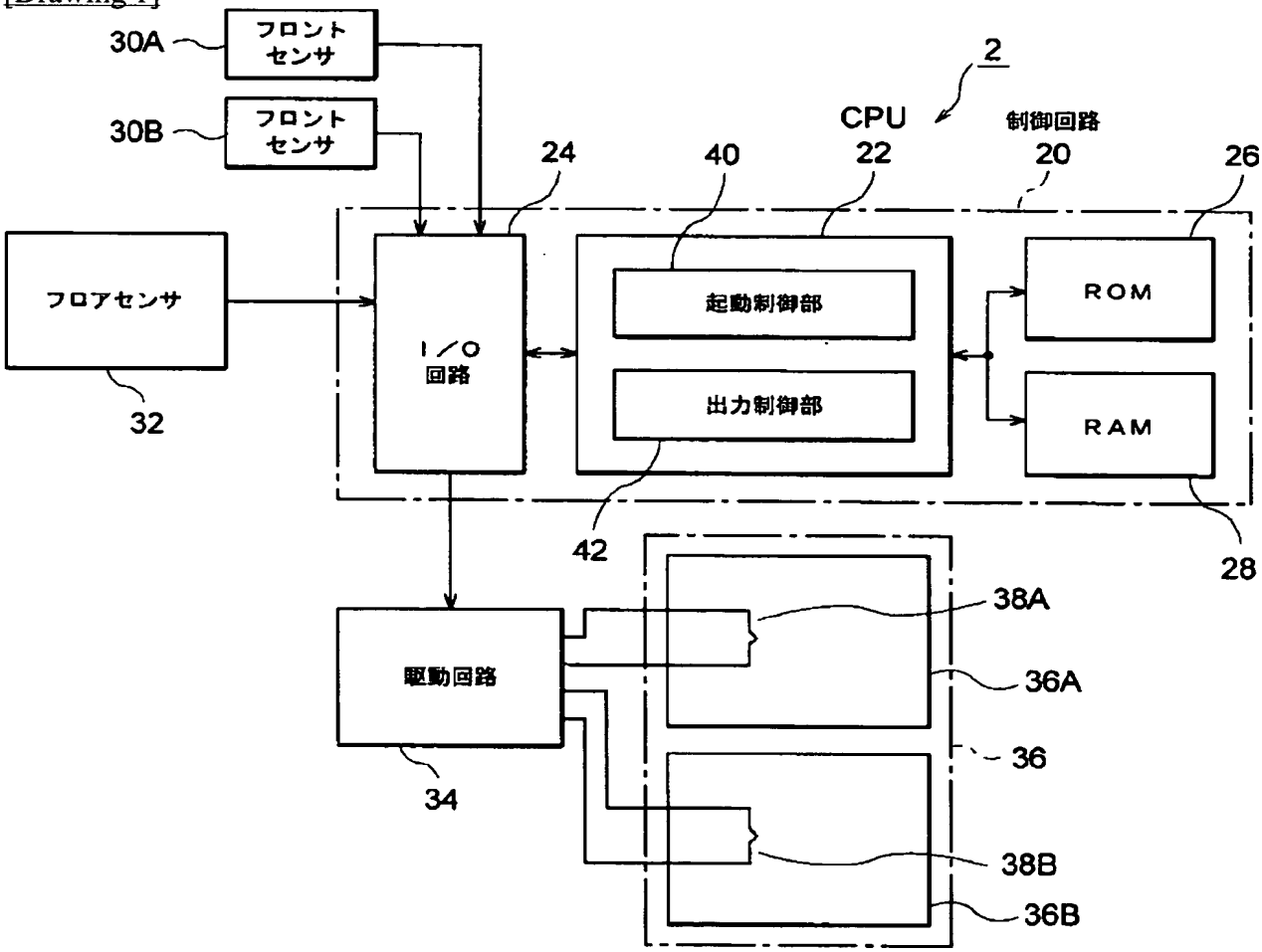
[Translation done.]

* NOTICES *

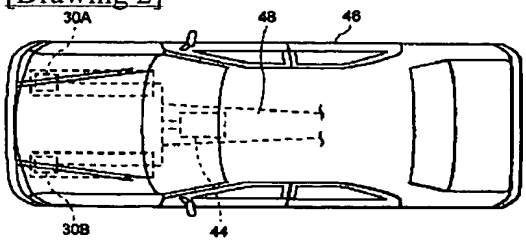
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

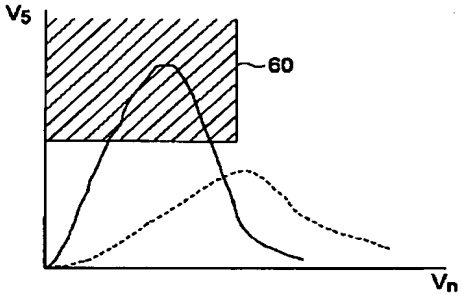
[Drawing 1]



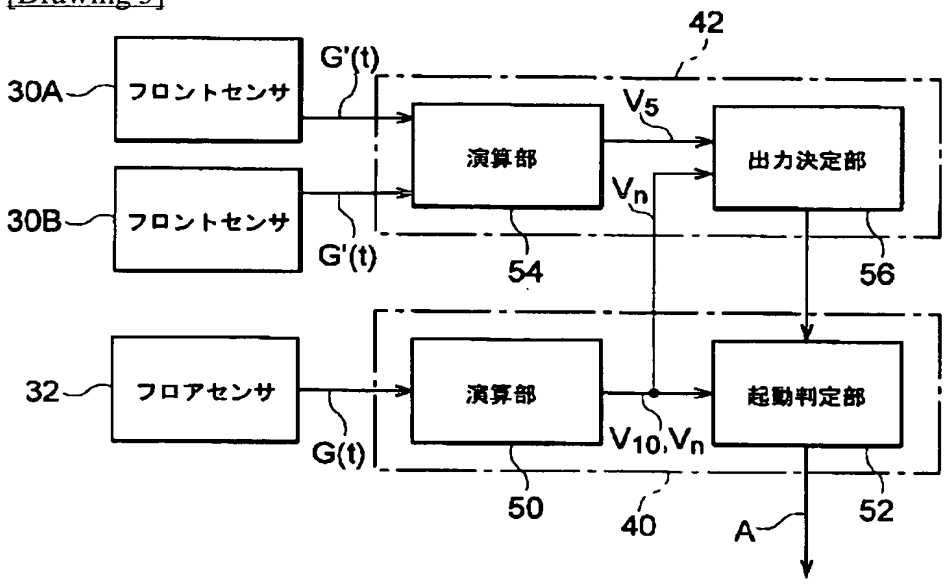
[Drawing 2]



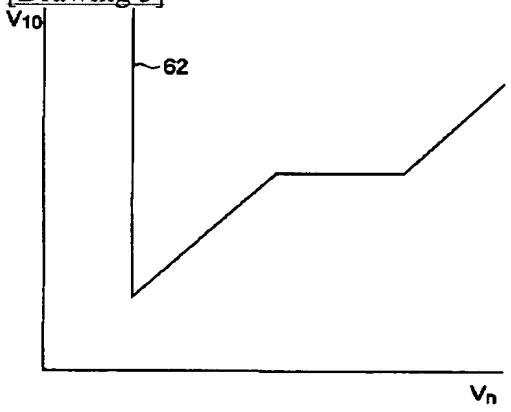
[Drawing 4]



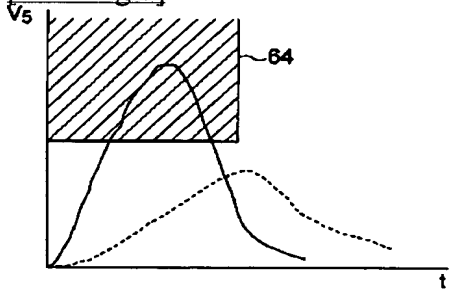
[Drawing 3]



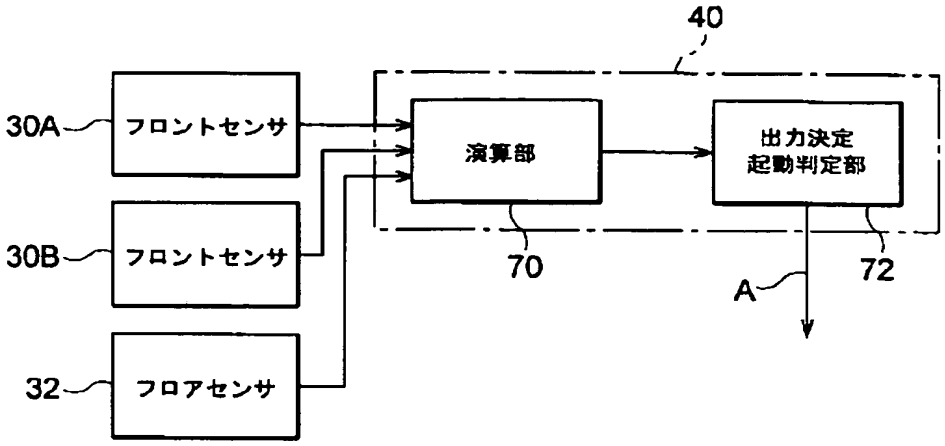
[Drawing 5]



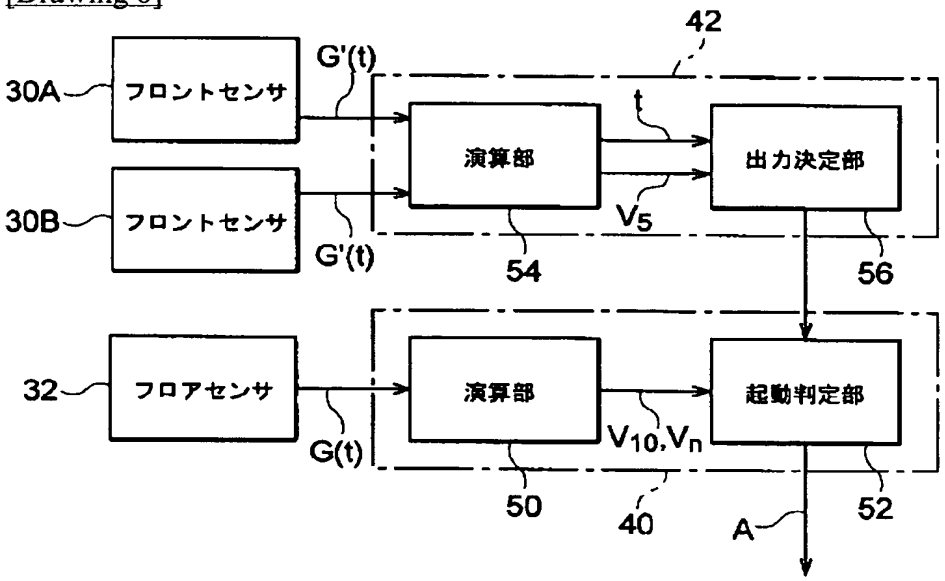
[Drawing 7]



[Drawing 10]

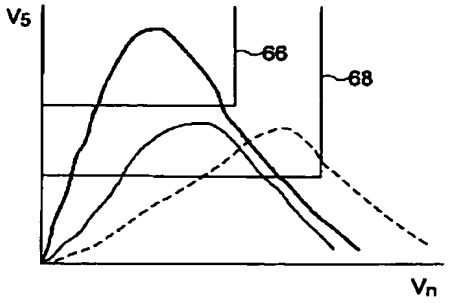


[Drawing 6]

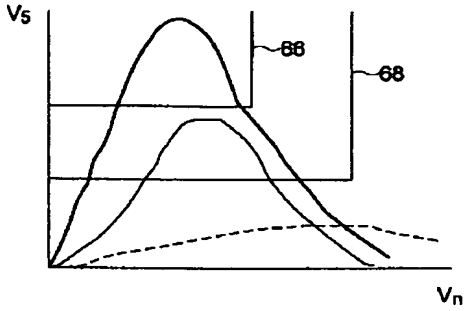


[Drawing 8]

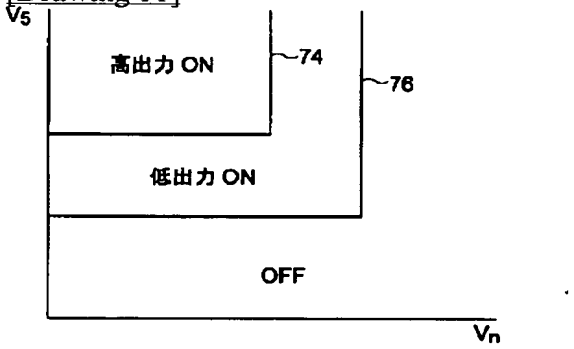
(a)
フロントセンサ30A



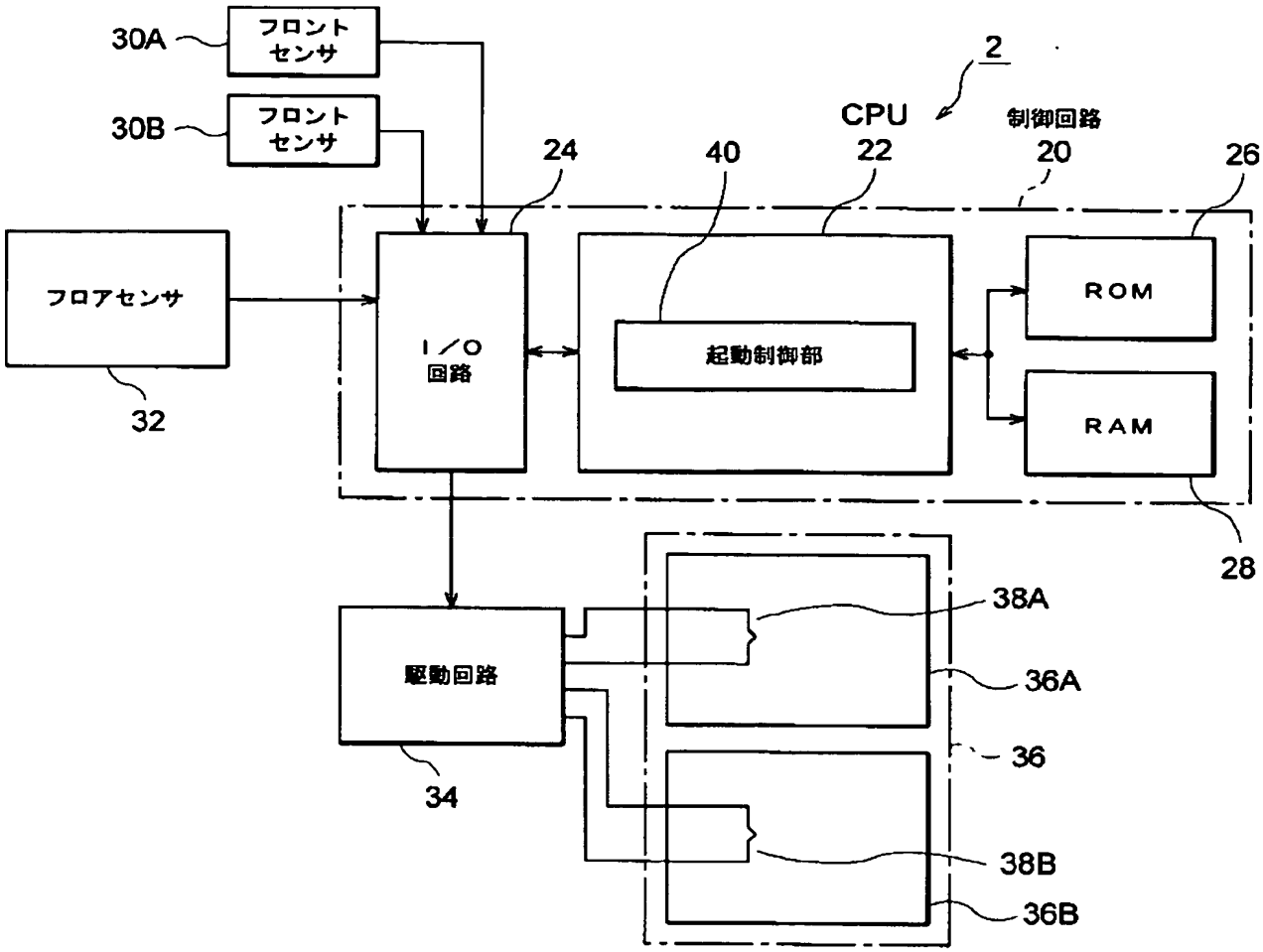
(b)
フロントセンサ30B



[Drawing 11]



[Drawing 9]



[Translation done.]

* NOTICES *

CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
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[Date of Publication] August 8, Heisei 12 (2000. 8.8)
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[The 7th edition of International Patent Classification]

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[FI]

B60R 21/32

[Procedure amendment]
[Filing Date] January 15, Heisei 13 (2001. 1.15)
[Procedure amendment 1]
[Document to be Amended] Description
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] When a car collides with a collision object, it is the starting control unit of the occupant crash protection which controls starting of the occupant crash protection carried in this car,
The 1st impact detection means established near the collision part of said car,
The 2nd impact detection means formed in car back rather than said 1st impact detection means,
The output-value control means which controls the output value of the inflator at the time of starting said occupant crash protection based on the detection value of said 1st impact detection means and said 2nd impact detection means,
Preparation,
Said output-value control means in the range where the integral value of the detection value of said 2nd impact detection means is smaller than the 2nd predetermined value when the integral value of the detection value of said 1st impact detection means is larger than the 1st predetermined value The starting control unit of the occupant crash protection characterized by the integral value of the detection value of said 2nd impact detection means enlarging the output value of said inflator in the range smaller than the 2nd predetermined value as compared with the case where the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value.
[Claim 2] When a car collides with a collision object, it is the starting control unit of the occupant crash protection which controls starting of the occupant crash protection carried in this car,
The 1st impact detection means established near the collision part of said car,
The 2nd impact detection means formed in car back rather than said 1st impact detection means,
The output-value control means which controls the output value of the inflator at the time of starting said occupant crash protection based on the detection value of said 1st impact detection means and said 2nd

impact detection means,
Preparation,
It has a detection means further at the time of the collision which detects the time of the collision of said car,

The time amount from the time of the collision detected by the detection means at the time of said collision said output-value control means in the range shorter than the 3rd predetermined value when the integral value of the detection value of said 1st impact detection means is larger than the 1st predetermined value The starting control unit of the occupant crash protection characterized by the time amount from the time of the collision detected by the detection means at the time of said collision enlarging the output value of said inflator in the range shorter than the 3rd predetermined value as compared with the case where the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value.
[Claim 3] Said 1st detection means is the starting control unit of the occupant crash protection according to claim 1 or 2 characterized by being constituted by the right anterior part detection means formed in the left anterior part detection means formed in the left anterior part of said car, and right anterior part, and controlling the output value of said inflator by said output-value control means based on the detection value of said left anterior part detection means and said right anterior part detection means.
[Claim 4] Said output-value control means With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, or said right anterior part detection means When either of the values calculated based on the detected detection value and the detection value of said 2nd impact detection means exceeds a predetermined threshold smaller than said 1st predetermined value and another side does not exceed a predetermined threshold With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, and said right anterior part detection means The starting control unit of the occupant crash protection according to claim 3 characterized by enlarging the output value of said inflator as compared with the case where both values calculated based on the detected detection value and the detection value of said 2nd impact detection means exceed a predetermined threshold smaller than said 1st predetermined value.
[Claim 5] Said left anterior part detection means and said right anterior part detection means are the activator unit of the occupant crash protection according to claim 3 or 4 characterized by being the electronic formula sensor formed near the collision part of the anterior part of a car, respectively.
[Claim 6] When a car collides with a collision object, it is the starting control unit of the occupant crash protection which controls starting of the occupant crash protection carried in this car,
The 1st impact detection means established near the collision part of said car,
The 2nd impact detection means formed in car back rather than said 1st impact detection means,
The starting control means which determines the output value of the inflator at the time of starting whether said occupant crash protection is started based on the detection value of said 1st impact detection means and said 2nd impact detection means, and said occupant crash protection,
Preparation,
When the value calculated based on the detection value of said 1st impact detection means and the detection value of said 2nd impact detection means exceeds the 1st output decision starting judging threshold, said starting control means It compares, when the value calculated based on the detection value of said 1st impact detection means and the detection value of said 2nd impact detection means does not exceed said 1st output decision starting judging threshold and the 2nd output decision starting judging threshold is exceeded. The starting control unit of the occupant crash protection characterized by enlarging the output value of said inflator.
[Claim 7] Said 1st impact detection means is the starting control unit of the occupant crash protection according to claim 6 characterized by being constituted by the electronic formula sensor formed in the electronic formula sensor and right anterior part which are prepared in the left anterior part of said car.
[Procedure amendment 2]
[Document to be Amended] Description
[Item(s) to be Amended] 0005
[Method of Amendment] Modification
[Proposed Amendment]
[0005]
[Means for Solving the Problem] The starting control unit of occupant crash protection according to claim 1 The 1st impact detection means which is the starting control unit of the occupant crash protection which

controls starting of the occupant crash protection carried in this car when a car collides with a collision object, and was established near the collision part of said car, The 2nd impact detection means formed in car back rather than said 1st impact detection means, It has the output-value control means which controls the output value of the inflator at the time of starting said occupant crash protection based on the detection value of said 1st impact detection means and said 2nd impact detection means. The integral value of the detection value of said 2nd impact detection means said output-value control means The 2nd predetermined value, The integral value of the detection value of said 1st impact detection means in the range smaller than the right end of the threshold 60 of drawing 4, the threshold 66 of drawing 8, and the threshold 74 of drawing 11 For example, the 1st predetermined value, For example, when larger than the soffit of the threshold 60 of drawing 4, the threshold 66 of drawing 8, and the threshold 74 of drawing 11 It is characterized by enlarging the output value of said inflator as compared with the case where the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value, in the range where the integral value of the detection value of said 2nd impact detection means is smaller than the 2nd predetermined value.

[Procedure amendment 3]
[Document to be Amended] Description
[Item(s) to be Amended] 0007
[Method of Amendment] Modification
[Proposed Amendment]
[0007] An output-value control means here in the range where the integral value of the detection value of said 2nd impact detection means is smaller than the 2nd predetermined value when the integral value of the detection value of said 1st impact detection means is larger than the 1st predetermined value The integral value of the detection value of said 2nd impact detection means enlarges the output value of said inflator in the range smaller than the 2nd predetermined value as compared with the case where the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value.
[Procedure amendment 4]
[Document to be Amended] Description
[Item(s) to be Amended] 0008
[Method of Amendment] Modification
[Proposed Amendment]
[0008] According to the starting control unit of this occupant crash protection according to claim 1, since the output value of the inflator at the time of starting occupant crash protection by the output-value control means based on the detection value of the 1st impact detection means and the 2nd impact detection means, i.e., the detection value of the detection means arranged in a mutually different location, is controlled, occupant crash protection can be started with the optimal output according to the violence of a collision.
[Procedure amendment 5]
[Document to be Amended] Description
[Item(s) to be Amended] 0009
[Method of Amendment] Modification
[Proposed Amendment]
[0009] Moreover, the starting control unit of occupant crash protection according to claim 2 The 1st impact detection means which is the starting control unit of the occupant crash protection which controls starting of the occupant crash protection carried in this car when a car collides with a collision object, and was established near the collision part of said car, The 2nd impact detection means formed in car back rather than said 1st impact detection means, It has the output-value control means which controls the output value of the inflator at the time of starting said occupant crash protection based on the detection value of said 1st impact detection means and said 2nd impact detection means. It has a detection means at the time of the collision which detects the time of the collision of a car. Said output-value control means The time amount from the time of the collision detected by the detection means at the time of said collision The 3rd predetermined value, In the range shorter than the right end of the threshold 64 of drawing 7, for example, when the integral value of the detection value of said 1st impact detection means is larger than the 1st predetermined value Time amount from the time of the collision detected by the detection means at the time of said collision is characterized by enlarging the output value of said inflator in the range shorter than the 3rd predetermined value as compared with the case where the integral value of the detection value of said 1st impact detection means is smaller than the 1st predetermined value.
[Procedure amendment 6]

[Document to be Amended] Description
[Item(s) to be Amended] 0010
[Method of Amendment] Modification
[Proposed Amendment]
[0010] According to this claim 1 and the starting control unit of occupant crash protection according to claim 2, in a high-speed collision An impact big when the integral value of the detection value of an impact detection means of the early stages of a collision, i.e., the 2nd, is smaller than a predetermined value, or when the time amount from the time of the collision detected by the detection means at the time of a collision is shorter than a predetermined value occurs. That is, since the integral value of the detection value of the 1st impact detection means becomes larger than a predetermined value, it can be judged as a high-speed collision, and based on this decision result, the output of an inflator can be made suitable.
[Procedure amendment 7]
[Document to be Amended] Description
[Item(s) to be Amended] 0011
[Method of Amendment] Modification
[Proposed Amendment]
[0011] Moreover, the starting control unit of occupant crash protection according to claim 3 Said 1st detection means of the starting control unit of occupant crash protection according to claim 1 or 2 It is constituted by the right anterior part detection means formed in the left anterior part detection means formed in the left anterior part of said car, and right anterior part, and is characterized by controlling the output value of said inflator by said output-value control means based on the detection value of said left anterior part detection means and said right anterior part detection means.
[Procedure amendment 8]
[Document to be Amended] Description
[Item(s) to be Amended] 0012
[Method of Amendment] Modification
[Proposed Amendment]
[0012] Moreover, the starting control unit of occupant crash protection according to claim 4 In the starting control unit of occupant crash protection according to claim 3 said output-value control means With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, or said right anterior part detection means A predetermined threshold with either smaller than said 1st predetermined value of the values calculated based on the detected detection value and the detection value of said 2nd impact detection means, For example, when the soffit of the threshold 68 of drawing 8 and the threshold 76 of drawing 11 is exceeded and another side does not exceed a predetermined threshold With the value calculated based on the detection value detected by said left anterior part detection means, and the detection value of said 2nd impact detection means, and said right anterior part detection means As compared with the case where both values calculated based on the detected detection value and the detection value of said 2nd impact detection means exceed a predetermined threshold smaller than said 1st predetermined value, it is characterized by enlarging the output value of said inflator.
[Procedure amendment 9]
[Document to be Amended] Description
[Item(s) to be Amended] 0013
[Method of Amendment] Modification
[Proposed Amendment]
[0013] According to this claim 3 and the starting control unit of occupant crash protection according to claim 4, the high-speed irregular collision of low-speed right **, high-speed offset collision, etc. can be distinguished exactly, and the output of an inflator can be controlled based on this distinction result. Moreover, in the activator unit of the occupant crash protection concerning claim 5, said left anterior part detection means and said right anterior part detection means are characterized by being the electronic formula sensor formed near the collision part of the anterior part of a car, respectively. The starting control unit of the occupant crash protection concerning claim 6 The 1st impact detection means which is the starting control unit of the occupant crash protection which controls starting of the occupant crash protection carried in this car when a car collides with a collision object, and was established near the collision part of said car, The 2nd impact detection means formed in car back rather than said 1st impact detection means, The starting control means which determines the output value of the inflator at the time of starting whether

said occupant crash protection is started based on the detection value of said 1st impact detection means and said 2nd impact detection means, and said occupant crash protection, When the value calculated based on the detection value of said 1st impact detection means and the detection value of said 2nd impact detection means exceeds the 1st output decision starting judging threshold, a preparation and said starting control means As compared with the case where the value calculated based on the detection value of said 1st impact detection means and the detection value of said 2nd impact detection means did not exceed said 1st output decision starting judging threshold, and the 2nd output decision starting judging threshold is exceeded, it is characterized by enlarging the output value of said inflator. In the starting control unit of the occupant crash protection concerning claim 7, said 1st impact detection means is characterized by being constituted by the electronic formula sensor formed in the electronic formula sensor and right anterior part which are prepared in the left anterior part of said car.

[Procedure amendment 10]
[Document to be Amended] Description
[Item(s) to be Amended] 0033
[Method of Amendment] Modification
[Proposed Amendment]
[0033] Next, with reference to drawing 6 and drawing 7, the starting control unit of the air bag equipment concerning the gestalt of implementation of the 2nd of this invention is explained. In addition, the starting control device of the air bag equipment concerning the gestalt of this 2nd operation is explained using the sign given to each configuration of the starting control device 2 of the air bag equipment concerning the gestalt of the 1st operation from it being what has the almost same configuration as the starting control device of the air bag equipment concerning the gestalt of the 1st operation (refer to drawing 1).

[Procedure amendment 11]
[Document to be Amended] Description
[Item(s) to be Amended] 0040
[Method of Amendment] Modification
[Proposed Amendment]
[0040] Next, with reference to drawing 8, the starting control unit of the air bag equipment concerning the gestalt of implementation of the 3rd of this invention is explained. In addition, the starting control device of the air bag equipment concerning the gestalt of this 3rd operation is explained using the sign given to each configuration of the starting control device 2 of the air bag equipment concerning the gestalt of the 1st operation from it being what has the almost same configuration as the starting control device of the air bag equipment concerning the gestalt of the 1st operation (refer to drawing 1 and drawing 3).

[Procedure amendment 12]
[Document to be Amended] Description
[Item(s) to be Amended] 0045
[Method of Amendment] Modification
[Proposed Amendment]
[0045] Furthermore, the value as which the output decision section 56 is determined with the output decision thresholds 66 and 68 of an output judging map, and the operation values V5 and Vn based on the deceleration by which it was detected by front sensor 30A, The value defined with the operation values V5 and Vn based on the deceleration detected by front sensor 30B is compared. It is judged that the high-speed ODB collision (irregular collision when a collision object is soft) occurred when [of these values] the output decision threshold 68 was exceeded on the other hand (collision side of a car) and another side (un-colliding side of a car) did not exceed a threshold 68. The signal which shows that the output of an inflator is made into high power is outputted to the starting judging section 52. That is, when a high-speed ODB collision occurs, since the output decision threshold 68 is exceeded as one side of the value defined with the operation values V5 and Vn shows drawing 8 (a) with a broken line, and the output decision threshold 68 is not exceeded as another side shows drawing 8 (b) with a broken line, it can be judged that the high-speed ODB collision occurred.

[Procedure amendment 13]
[Document to be Amended] Description
[Item(s) to be Amended] 0051
[Method of Amendment] Modification
[Proposed Amendment]
[0051] Moreover, operation part 70 performs a predetermined operation, i.e., an operation with a formula 2,

to decelerating G (t) outputted from the floor sensor 32, and calculates the operation value Vn. This operation value Vn is inputted into the output decision starting judging section 72.
[Procedure amendment 14]
[Document to be Amended] Description
[Item(s) to be Amended] 0053
[Method of Amendment] Modification
[Proposed Amendment]
[0053] Moreover, when the value defined with the operation values V5 and Vn does not exceed the output decision starting judging threshold 74 but exceeds the output decision starting judging threshold 76, the seizing signal for starting an inflator by low-power output to the actuation circuit 34 is outputted. On the other hand, when the value defined with the operation values V5 and Vn does not exceed the output decision starting judging threshold 76, a seizing signal is not outputted to the actuation circuit 34.

[Translation done.]